

APPENDIX A

```
1      initialization
1.1      set  $c=0$ ,  $j=0$ , and  $i=0$ 
2      if  $(0 \leq i \leq m)$  e.g., within the range of S, then
5      2.1      if (group j not fully matched AND  $i \leq m$ ), then
2.1.1      match event i against group j
2.1.2      increase i by 1
2.1.3      if all event categories in group j are matched BUT  $\omega_j$ 
              violated), then
10     2.1.3.1      make h to be the smallest index such that  $T(e_h) \geq T(e_i) - \omega_j$ 
2.1.3.2      set i to h
2.1.3.3      remove all matches in group j
2.1.4      go to 2.1
2.2      if group j cannot be matched and  $i > m$ , then go to 3
15     2.3      else if  $\beta_{j-1}$  is violated, then
2.3.1      make i the smallest index such that  $T(e_h) \geq$  (latest time in
              group j) -  $\beta_j$ 
2.3.2      decrease j by 1 to rework the previous group
2.4      else // group j succeed
20     2.4.1      increase i so that  $T(e_i) > \alpha_j +$  e.g., make i the latest time in
              group j
2.4.2      if  $c > 0$ , then
2.4.2.1      increase i so that  $T(e_i) >$  (earliest time in group j) in the last
              matched occurrence)
25     2.4.3      increase j by 1
2.5      if j equals g, i.e., current occurrence is fully matched, then
2.5.1      increase c by 1
2.5.2      remove event instances in current matched occurrence
2.5.3      reset  $j = 0$ 
30     2.5.4      direct i to point to the event right after earliest event in the
              current matched occurrence
2.6      go to 2
3      report c
```

APPENDIX B

- 1 Method initialization
 - 1.1 Determine $\varphi_{1,z}$ and λ_1
 - 1.2 Determine δ
 - 5 1.3 Set $\psi_e = 0$, $\psi_o = \psi_1$
 - 1.4 Determine γ_1
 - 1.5 Assume $\sigma = 1$
 - 1.6 Assume $\mu^- = \delta + \psi_e$ and $\mu^+ = \delta + \psi_o + \gamma_1$
- 2 if $\mu^+ - \mu^- \leq \rho\mu^-$, then break, if not then
 - 10 2.1 Determine $\varphi_{k,z}$ and λ_k for $k = 2\sigma, 2\sigma + 1$
 - 2.2 If $2\sigma \geq x$, then go to 3
 - 2.3 Update ψ_e
 - 2.4 Update μ^-
 - 2.5 If $\mu^+ - \mu^- \leq \rho\mu^-$, then go to 3
 - 15 2.6 If $2\sigma + 1 \geq x$, then go to 3
 - 2.7 Update ψ_o
 - 2.8 Update μ^+
 - 2.9 Set $\sigma = \sigma + 1$
 - 2.10 Go to 2
- 20 3 Output μ^+ and μ^-

APPENDIX C

- 1 Method initialization
 - 1.1 Determine $\varphi_{1,z}$ and λ_1 :

$$\varphi_{1,0} = 1$$

$$\varphi_{1,1} = -1$$

$$\lambda_1 = q^{2(y-x+1)}$$
 - 1.2 Determine δ : $\delta = x - (q^{y-x+1}(1-q^x))/(1-q)$
 - 1.3 Set $\psi_e = 0$, $\psi_o = \psi_1$: where

$$\psi_1 = q^{2y-2x+3}(1-q)$$
 - 1.4 Determine γ_1

$$\gamma_1 = \lambda_1 ((q^2-q^x)/(1-q)-(q^4-q^{2x})(1-q^2))$$
 - 1.5 Set $\sigma = 1$
 - 1.6 Set $\mu^- = \delta + \psi_e$ and $\mu^+ = \delta + \psi_o + \gamma_1$
- 2 while $(\mu^+ - \mu^- \leq \rho\mu^-)$, then break, if not then
 - 2.1 Determine $\varphi_{k,z}$ and λ_k for $k = 2\sigma, 2\sigma + 1$:

$$\varphi_{k,0} = \sum_{z=1}^k -\varphi_{k,z}q^z$$

$$\varphi_{k,z} = -(\varphi_{k-1,z-1})/(1-q^z)$$

$$\lambda_k = -\lambda_{k-1}(1-q^k)q^{y-x+1}$$
 - 2.2 If $(2\sigma \geq x)$, then go to 3
 - 2.3 Update ψ_e :

$$\text{increase } \psi_e \text{ by } \sum_{z=1}^{2\sigma-2} [\lambda_z \sum_{w=0}^z \varphi_{z,w}(q^{(2\sigma+1)(w+1)} + q^{2\sigma(w+1)})]$$
 - 2.4 Update μ^- : Set $\mu^- = \delta + \psi_{2\sigma} + \gamma_{2\sigma}$
 - 2.5 If $(\mu^+ - \mu^- \leq \rho\mu^-)$, then go to 3
 - 2.6 If $(2\sigma + 1 \geq x)$, then go to 3
 - 2.7 Update ψ_o :

$$\text{increase } \psi_o \text{ by } \sum_{z=1}^{2\sigma-1} [\lambda_z \sum_{w=0}^z \varphi_{z,w}(q^{(2\sigma+1)(w+1)} + q^{2\sigma(w+1)})]$$
 - 2.8 Update μ^+ : Set $\mu^+ = \delta + \psi_{2\sigma+1} + \gamma_{2\sigma+1}$
 - 2.8 Set $\sigma = \sigma + 1$
- 3 Output μ^+ and μ^-